Integrated geophysical studies of the Komandorsky Basin crustal structure and tectonics

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An analysis and integrated interpretation of seismic, gravity and magnetic data is presented to define the crustal structure and tectonics of the Komandorsky Basin in the Bering Sea. Arrays of Ocean Bottom Seismometers were used for recording refraction and wide-angle reflection waves initiated by 30 L airgun every 150 m along detailed grid of profiles.

Computer processing of seismic data is resulted in 1D, 2D and 3D crustal models for central area of the Basin. The earth's crust consists of layers with seismic velocities of 1.8; 2.4-2.6; 5.0 and 6.0-6.8 km/s underlying by Moho discontinuity (8.0 km/s). The average thickness of the crust is about 8 km. An evident crustal inhomogeneity is revealed by seismic tomography manifested in 3D images. The most significant changes of thickness were observed for 5.0 km/s layer.

In transition zone between the Komandorsky Basin and the Shirshov Ridge the larger thickness of the crust (11 km) was revealed. The increase of crustal thickness in comparison to central area is due of greater thickness of 6.5 km/s layer. The earth's crust under the Shirshov Ridge is characterized by larger thickness of main layers and availability of additional layer with velocity of 6.0 km/s.

New structural-tectonic map of the Komandorsky Basin is compiled as a result of integrated interpretation of seismic refraction and reflection profiles, shipborne gravity and magnetic measurements and free-air gravity anomalies derived from satellite altimetry.